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forces, run-up, scour and scour protection

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Publication date:
2005

Document Version
Early version, also known as pre-print

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Forces, Run-up, Scour and Scour Protection

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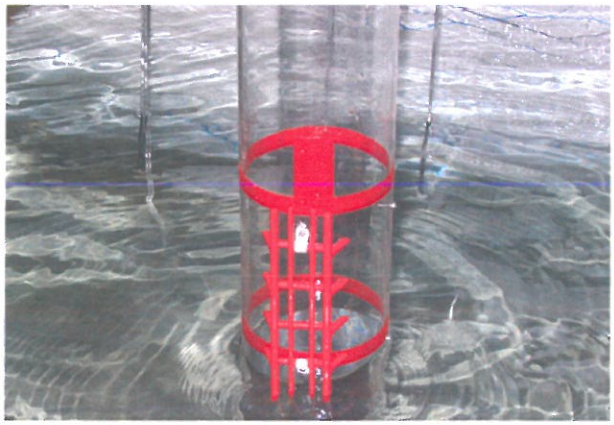
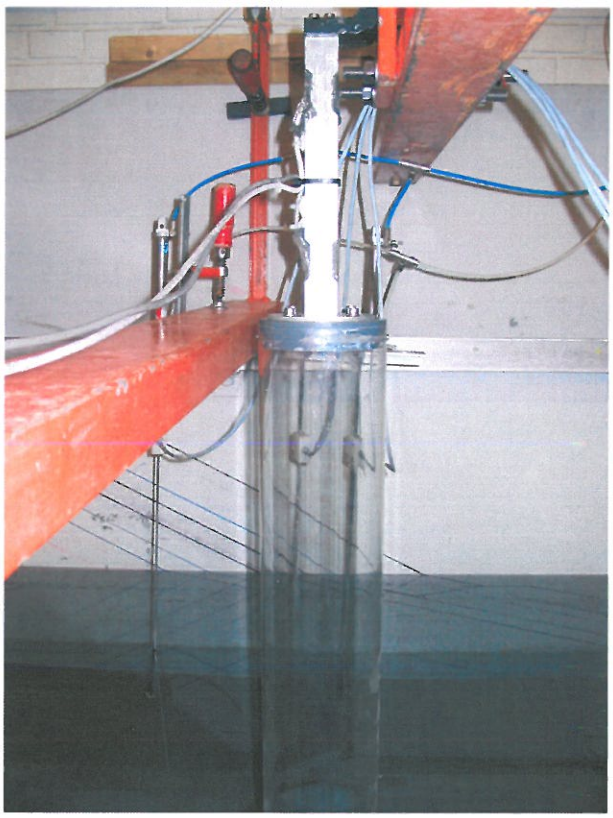
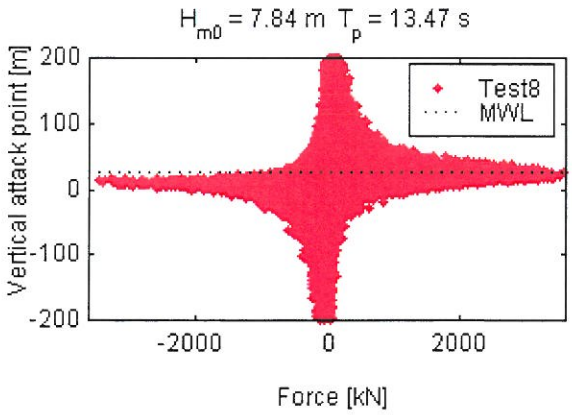
The Borkum Riffgrund offshore wind farm project is developed by Energi E2 and Plambeck Neuen Energien. Aalborg University has carried out model tests for the design. They comprimise of force measurements, run-up tests, scour measurements and scour protection tests on windturbine foundations.

Forces

The horizontal wave forces are measured on three different structures. The size of the force and the height of its attack point are found with two moment measurements. The tested structures are a monopile, a steel tripod and a concrete tripod.

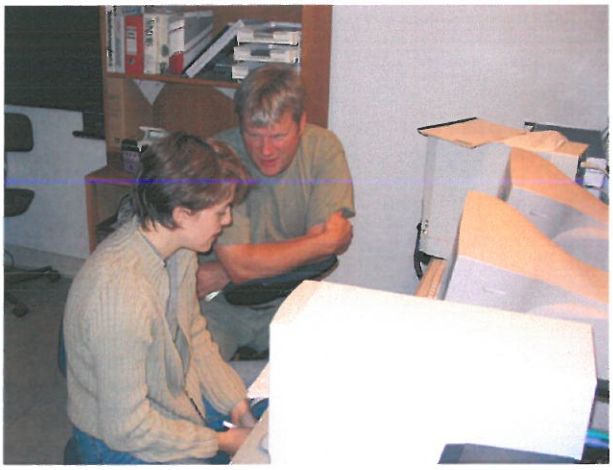


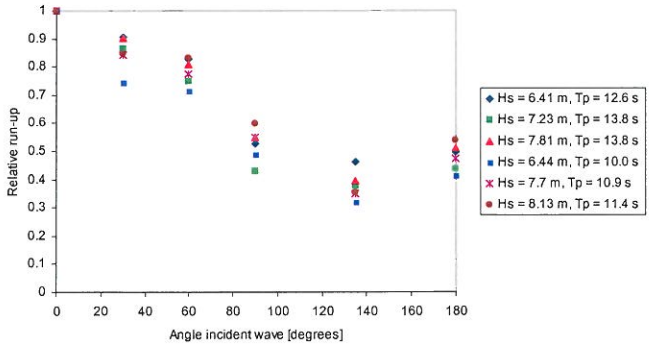




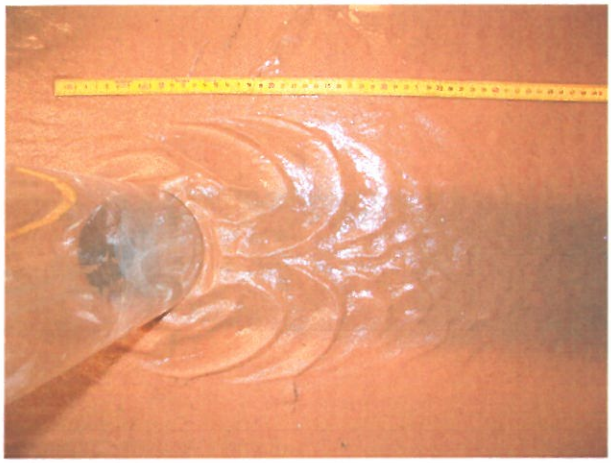
Run-up

Some run-up measurements on the monopile are made to get an insight in maximum run-up and run-up distribution along the pile. Capacitance gauges together with video recordings are used to determine the run-up.

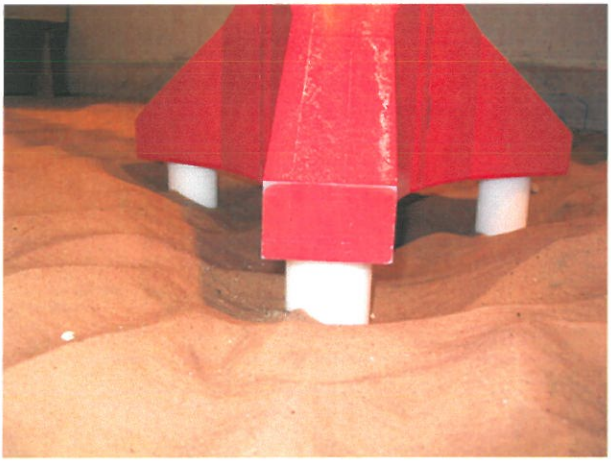


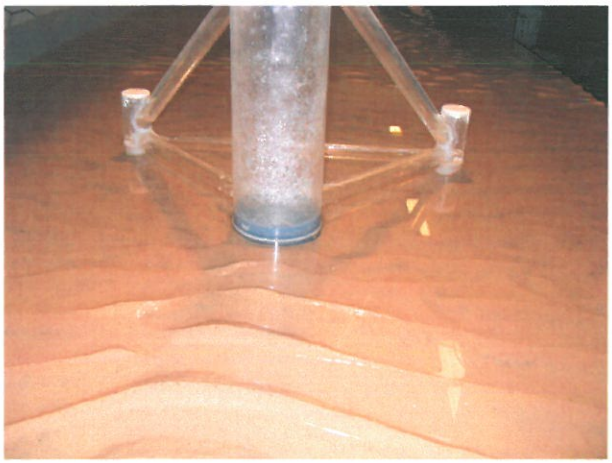


Scour



The same three structures as in the force tests are also tested for scour. The depth and extend of the scour holes are measured. The size of the scour holes is important with regard to the need for scour protection. The extend of the scour holes bares an influence on the necessary extend of the protection.





Scour Protection

Three different sizes of scour protection material are tested. In addition to the same three structures as previously tested, a cone foundation has been added to the test programme.